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Analyzing the Data Collectors in Wireless Sensor Networks Using Strategies

Nilesh V. Wanare

PG. Student, Department of Computer Engineering, RMDSSOE, Warje-Pune, Maharashtra, India

ABSTRACT: In wireless sensor network, network lifetime depends upon the sense data and energy consumption from the sensor attached to the base stations. To sense the more data and energy, data collector used to traverse through entire network. This paper emphasis on data gathering scheme and limiting the capacity of data collectors. It further can be improved by adding the amount of sensors energy to sense more data and stored to sink node before given data delivery deadline. This paper includes a game model with strategies and players to gain more sense data. It also resolves the traffic situations among the data collectors. The strategies like ADADG (Adaptive delay aware data gathering) and EDGM (Enhanced data gathering strategy) help to set the breakpoints among the data collectors.

KEYWORDS: Wireless Sensor Networks, Game Theory, Data Gathering, Mobile Data Collector.

I. INTRODUCTION

The wireless sensor networks consist of nodes which sense the allocated area and transfer the energy from one node to another. These nodes are battery powered they timely sense the area in which they are configured. These nodes also determine the energy hole around the devices. This system also proposes a analytical model to evaluate the network life-time, energy consumption. Wireless sensor network balances the energy consumption and improve the network performance. These wireless sensor network used in applications like military surveillance, environmental monitoring, infrastructure monitoring, facility diagnosis and also in industry applications. Typically, in multihop data communication scenario, the sensors closed to the sink are the first to run out of energy. This is due to fact that these sensors are required to forward data of all other nodes. Once these nodes are disconnected, the operational lifetime of the network ends, since the entire network become unable to communicate with the sink. Hence, reducing the energy consumption becomes a major challenge. In this paper, we focus on data collection applications. To elaborate, we consider using one or more mobile data collectors to gather the data from sensors. Each mobile data collector could be a mobile robot or a vehicle equipped with a powerful transceiver, battery and large memory. Each mobile data collector starts a tour from the data sink, traverses the network, collects sensing data from nearby nodes while moving, and then returns and uploads data to the data sink. So, if the moving path is well-planned, network lifetime is expected to be prolonged, and sensors can be made very simple and inexpensive. Besides, this data gathering scheme can be performed in both connected networks and disconnected networks.

II. RELATED WORK

In " Mobile Element Scheduling for Efficient Data Collection in Wireless Sensor Networks with Dynamic Deadlines" ,[1] It defines that wireless sensor networks, mobile elements are built into the system to improve the network lifetime.. The mobile element, which is controlled , visits the nodes to collect their data when their buffers are full. It may happen due to sensor nodes are sampling at different rates, in which case some nodes need to be visited more frequently as compared to others.

In " Distributed Coverage Control for Mobile Sensors with Location-dependent Sensing Models"[2], This system defines problem of coverage control of a network of mobile sensors. In the current literature, this is commonly considered as a locational optimization problem where the assumption that sensing performance is independent of the locations of sensors. This system considers a distributed control law and coordination algorithm. If the global sensing performance function is known a priori, system prove that the algorithm is guaranteed to converge. To validate this

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algorithm, this system conduct experiments with indoor and outdoor deployments of Cyclops cameras and model its sensing performance. This model is used to simulate deployments on 1D pathways and study the coverage obtained.

In "Efficient Data Gathering with Mobile Collectors and Space-Division Multiple Access Technique in Wireless Sensor Networks"[3], In wireless sensor networks, mobile base stations and collect data from associated sensors via single-hop transmissions so as to achieve uniform energy consumption. It uses SDMA technique to data gathering by equipping each SenCar with multiple antennas such that distinct compatible sensors may make concurrent data uploading to a SenCar. System focus on minimizing the maximum data gathering time among different regions and refer to it as mobile data gathering with multiple SenCars and SDMA (MDG-MS) problem. This system propose a region-division and tour-planning (RDTP) algorithm in which data gathering time is balanced among different regions.

In "Efficient integer programming formulations for optimum sink location and routing in wireless sensor networks" [4], this system explains the routing and sink location problems in sensor networks and propose two new mixed integer programming formulations to determine optimal sink locations and data flow routes. The sensor field consists of a finite set of points, and sensors, which are located on a subset, cover the points of the field completely. Experimental results indicate that these new formulations are very efficient and optimal solutions can be computed easily even for large networks. It also defines Lagrangean relaxation methods to solve the formulations approximately

In "Network Lifetime Maximization in Delay-Tolerant Sensor Networks With a Mobile Sink" [5], this system investigate the network lifetime maximization problem in a delay-tolerant wireless sensor network with a mobile sink by exploiting a nontrivial tradeoff between the network lifetime and the data delivery delay. It builds the problem as a joint optimization problem that consists of finding a trajectory for the mobile sink and designing an energy-efficient routing protocol to route sensing data to the sink, subject to the bounded delay on data delivery and the given potential sink location space propose a novel optimization framework, which not only prolongs the network lifetime but also improves the other performance metrics including the network scalability, robustness, and the average delivery delay.

In "EDGM: Energy Efficient Data Gathering with Data Mules in Wireless Sensor"[6], The system explains the prolonging the lifetime of a wireless sensor network by exploiting mobility. It consider data gathering applications where each event occurring in the monitored area must be reported to the sink. The target applications are assumed to be delay tolerant. The system define the network lifetime as the time until coverage loss. Also propose an energy efficient strategy to collect data from sensor nodes, using data mules. This strategy has the advantage of not requiring network connectivity.

In "Data Gathering in Wireless Sensor Networks with Mobile Collectors"[7], this system represents data gathering mechanism for large scale wireless sensor networks by introducing mobility into the network. A mobile data collector, or for convenience called *M-collector* in this paper, could be a mobile robot or a vehicle equipped with a powerful transceiver and battery, works like a mobile base station and gathers data while moving through the field. The system present a heuristic tour-planning algorithm for a single M-collector. For the applications with a strict distance/time constraint for each data gathering tour, system also utilize multiple M-collectors to traverse through several shorter sub-tours concurrently to satisfy the distance/time constraint. Our single-hop data gathering scheme will improve the scalability and solve intrinsic problems of large scale homogeneous networks.

In "A Delay-Aware Data Collection Network Structure for Wireless Sensor Networks"[8], The Wireless sensor nodes are battery-powered devices. Energy saving is always crucial to the lifetime of a wireless sensor network. In some algorithms data collection efficiency is usually compromised in return for gaining longer network lifetime. In return for gaining longer network lifetime The objective of the proposed network structure is to minimize delays in the data collection processes of wireless sensor networks. Two network formation algorithms are designed to construct the proposed network structure in a centralized and a decentralized approach. Performances of the proposed network structure are examine using computer simulations.

.In "Maximizing the Lifetime of Wireless Sensor Networks with Mobile Sink in Delay-Tolerant Applications" [9], This system proposes a framework to improve the lifetime of the wireless sensor networks (WSNs) by using a mobile sink

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when the underlying applications tolerate delayed information delivery to the sink. Within a prescribed delay tolerance level, each node does not need to send the data immediately as it becomes available. To find the best solution within the proposed framework, the system formulate optimization problems that maximize the lifetime of the WSN subject to the delay bound constraints, node energy constraints, and flow conservation constraints.

III. OBJECTIVE AND CONSTRAINTS

In wireless sensor network, Sensor nodes Energy is essential and challenging for lifetime analysis , because it can lead to a premature death of the network and it also result into network disabled. These system prove that the energy hole problem and network traffic amongs the data is unavoidable in the Wireless sensor network under some specific conditions. It also analyze in what condition the energy holes could appear. It defines the load balancing techniques to resolve energy hole problem in large-scale WSNs, and propose a distributed heuristic solution to balance the energy consumption of sensor nodes by adjusting their transmission power. The energy hole problem has also been studied in cluster-based WSNs. Most of the existing works suppose that energy hole locates around the sink, and design energy-efficient routing protocols to mitigate the unbalanced energy consumption and prolong the network lifetime. However, recent investigations point out that energy hole does not always emerge close to the sink and highly depends on some network parameters, such as the energy consumption model and transmission range of sensor nodes. However, theoretic analysis is not provided in existing works to estimate the emerging time and location of the energy hole, as well as its evolution process.

IV. CONCLUSION

This paper helps to resolve the game theory problem by introducing strategies with algorithms. Each strategy decides to stop or not at a given number of Breakpoints, data collectors routing should be minimum than a limited data delivery delay deadline.

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